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ABSTRACT

This is the last part of a series of four modules intended to present guidelines for self-assessment of secondary science teachers. This module is subdivided into three sections dealing with space and facilities, equipment and materials, and policies and practices regarding staff. The assessment focuses on desirability and achievement. (SA)

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ED176977

Guidelines for Self-Assessment of Secondary-School Science Programs

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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4. Science Facilities and Teaching Conditions in Our School

SE 028 884

National Science Teachers Association

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This module is one part of a set of guidelines for the self-assessment of science programs, prepared by the National Science Teachers Association. The modules in the set are:

1. **Our School's Science Curriculum**
2. **Our School's Science Teachers**
3. **Science Student/Teacher Interactions in Our School**
4. **Science Facilities and Teaching Conditions in Our School**

Prices for the complete set and for individual modules are:

Complete Self-Assessment Package	471-14746	$5
Modules: Curriculum	471-14736	$1
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Ordering Information: The complete Self-Assessment package includes an introductory preface, one copy of each of the modules, and a report form. The modules may be ordered separately by title and stock number. All orders must be prepaid except those on official order forms. Prepaid orders under $10.00 add $ .50 postage and handling; over $10.00 add $1.00 postage and handling. Shipping and handling charges will be added to all billed purchase orders. Please make checks payable to NSTA.

IV. Science Facilities and Teaching Conditions in Our School

This portion of the *Guidelines for Self-Assessment of Secondary-School Science Programs* focuses on space and physical facilities for science classrooms and laboratory activities and on the conditions — the atmosphere, so to speak — surrounding science teaching in the science department. This module is subdivided into three sections dealing, respectively, with space and facilities, teaching/learning equipment and materials, and policies and practices in regard to staff. Guidelines and suggested procedures for self-assessment are given at the beginning of each section.

As in the curriculum module, it is strongly recommended that the self-assessment outlined in this module be done by a committee or task force comprised of the science faculty (all or some), students, parents, the administration, and/or other representatives of the community served by the school. No doubt exchanges of information, discussion, and possibly debate will be necessary in order to arrive at group consensus on the ratings to be assigned to the various items.

A twofold assessment is called for — the first, in terms of the DESIRABILITY of the various aspects of preparation, professional activities, and attitudes, for **your teaching situation** and **your school**. The second is an assessment of the degree of ACHIEVEMENT of the item. The rating scales to be used are as follows:

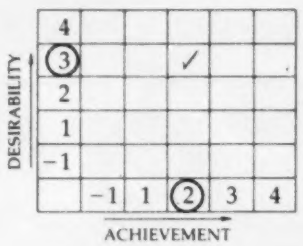
DESIRABILITY for Our School

4 — **very desirable;** of utmost value
3 — **desirable;** of significant value
2 — **moderately** desirable
1 — **unimportant;** of insignificant value in our school science program
—1 — **undesirable;** of negative value in our school science program

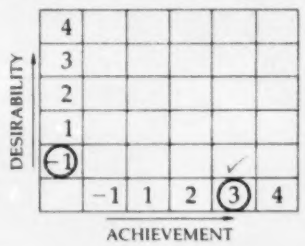
ACHIEVEMENT in Our School

4 — **excellent;** outstanding, extremely high level
3 — **very good;** above average
2 — **moderate** but significant; about average
1 — **low** (small) achievement or practice; below average
—1 — avoided or counteracted in our school

At the right of each item is a small matrix in which the rating is recorded. The vertical axis represents DESIRABILITY. Circle the rating that you wish to give to desirability. The horizontal axis represents ACHIEVEMENT. Circle the rating that you wish to give to achievement. Then, for the score on this item, place a check mark in the box where these ratings intersect. Thus, an item that was deemed highly desirable but only moderately achieved would be recorded as follows:



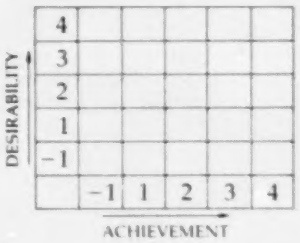
An item considered undesirable, but found to be present to a high degree would be recorded as follows:



A. Classroom, Laboratory, and Related Space and Facilities

Consider, discuss, and evaluate each of the following items for the degree of its importance or desirability in the kind of science program that **you** want in **your** school. Next, review the actual situation in your school and determine the extent to which each item is provided, has been achieved, or is practiced. Rate each item, plus others you may wish to add, by marking the matrix adjacent to it.

1. Our science facilities include classroom and laboratory activity areas which adapt well for each course that is taught.

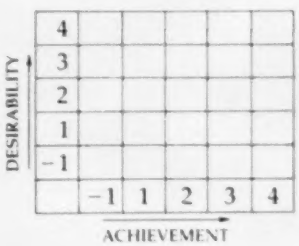


Comments _____

2. Our classrooms and laboratory areas are adequate in number and size for the number of students who take science courses.

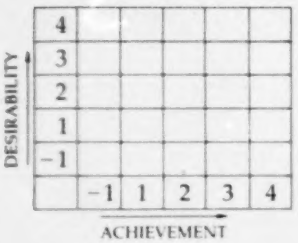
Comments _____

3. Our classrooms and laboratory areas are designed to accommodate or facilitate full-class instruction and/or discussions.



Comments _____

4. Our classrooms and laboratory areas are designed to accommodate or facilitate full-class laboratory work.

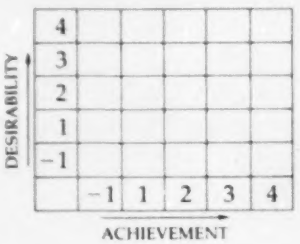


Comments _____

5. Our classrooms and laboratory areas are designed to accommodate or facilitate small-group activities (say, 4 to 6 students; committee activity, discussion, laboratory activities).

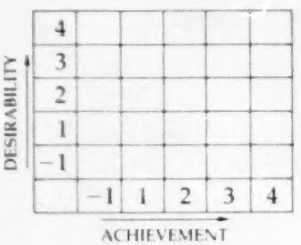
Comments _____

6. Our classrooms and laboratory areas are designed to accommodate or facilitate individualized or independent study activities; e.g., student lab projects, library or reference reading, making displays.



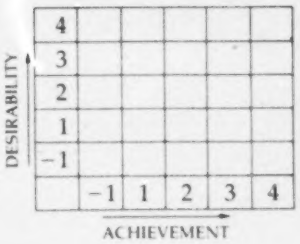
Comments _____

7. Our classrooms and laboratory areas are designed to accommodate or facilitate student/teacher conferences and counseling.



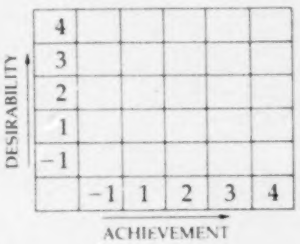
Comments _____

8. Our total laboratory area is adequate in size for real experimentation; i.e., they provide at least 5 square meters per student in a combined classroom-laboratory or 4 square meters per pupil in a separate laboratory area.



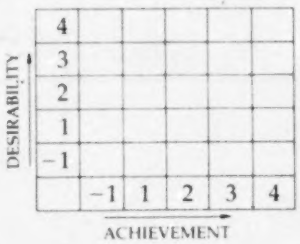
Comments _____

9. The size of individual laboratory work surfaces are adequate; i.e., approximately one square meter per student.



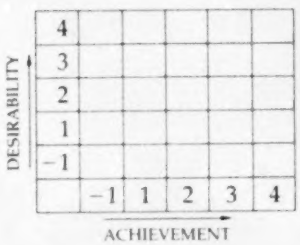
Comments _____

10. Laboratory tables and work surfaces are adequately heat- and chemical-resistant for the courses for which they are used.



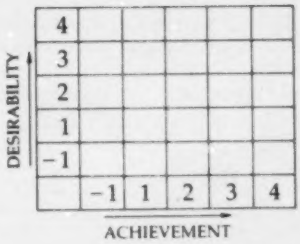
Comments _____

11. Student laboratory working spaces include ready access to utilities and other services.



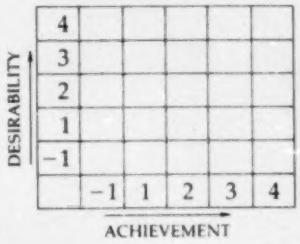
Comments _____

12. Laboratory areas are adequately provided with devices, means, and directions for proper, safe disposal of waste materials; e.g., broken glass, chemicals, plant and animal specimens.



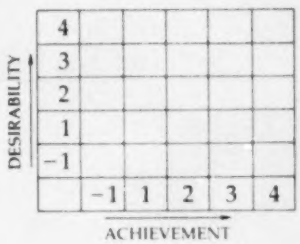
Comments _____

13. Each classroom area includes a demonstration table provided with essential services and located so that demonstrations can be viewed by the entire class.



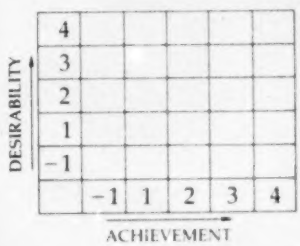
Comments _____

14. Each classroom area is well adapted for the use of audiovisual equipment and techniques, including adequate chalkboard space, bulletin or display boards, room-darkening blinds or curtains, display cases, and projection screen.



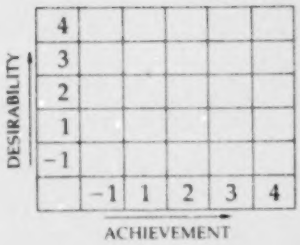
Comments _____

15. A professional departmental library is maintained by and is accessible to the science faculty with funds provided within the budget.



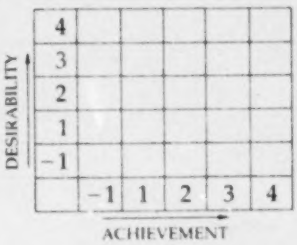
Comments _____

16. The departmental professional library includes a good selection of professional books, periodicals, and newsletters or other current releases of information relating to science teaching; e.g., recent as well as "classic" books on methods of science teaching; books on specialized educational endeavors, such as research design and methods, evaluation, counseling; newsletters or other reports of recent and current curriculum development projects.



Comments _____

17. Photographic darkroom facilities are included in or are readily accessible to the science department.

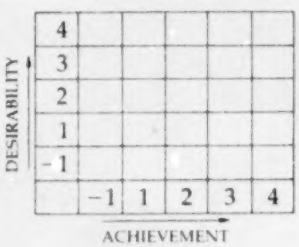


Comments _____

18. Shop facilities are included in or are readily accessible to the science department.

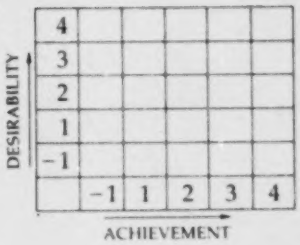
Comments _____

19. Adequate equipment and space have been provided for growing plants under controlled conditions of light, temperature, and humidity.



Comments _____

20. Adequate equipment and space have been provided for the maintenance of animals in a humane manner.

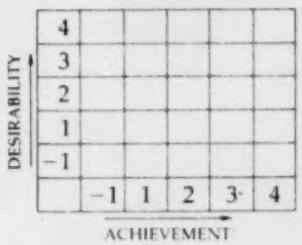


Comments _____

21. An outdoor nature study area is available on or near the school grounds or campus.

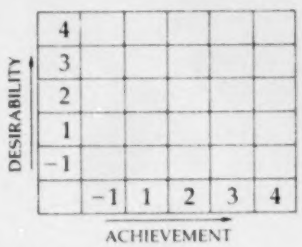
Comments _____

22. Each laboratory area or each course taught (e.g., chemistry, biology, earth science) is provided with storage space for the supplies and equipment used (approximately 15 percent of the total area).



Comments _____

23. Storage areas are adjacent or readily accessible to the classrooms or laboratories where the materials are used.



Comments _____

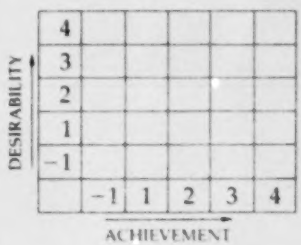
24. Special storage facilities and security measures are provided for items and materials that are particularly costly, delicate, or that are hazardous, poisonous, or flammable.

Comments _____

25. Adequate preparation, maintenance, and repair facilities are provided for teachers, including space, utilities, and limitations on student access.

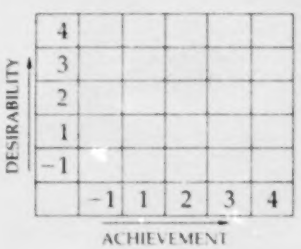
Comments _____

26. The materials, equipment, and services in our science department are kept in good working order.



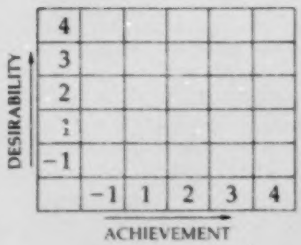
Comments _____

27. Adequate office facilities are provided for each teacher, including desk and drawer space, file cabinet space, book shelves or cases.



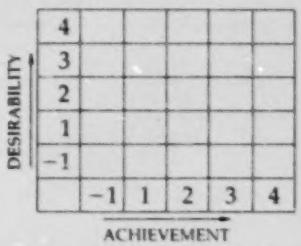
Comments _____

28. Other: _____



Comments _____

29. Other: _____

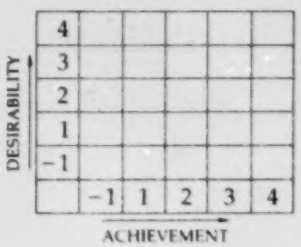


Comments _____

B. Laboratory Safety

1. Adequate measures and devices are provided to maximize safety precautions for students and others working in the science classrooms and laboratories.

Suggestion: Rate items 2-16, then develop an overall rating for safety as a whole, and then complete this matrix.

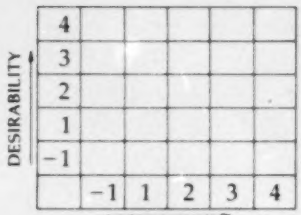


Comments _____

2. Our school has an automatic sprinkler system.

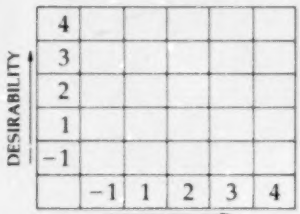
Comments _____

3. Each laboratory area has two unobstructed exits.



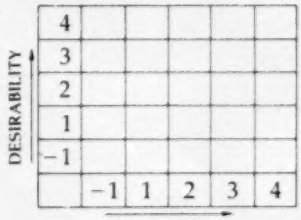
Comments _____

4. Science classrooms and laboratories have adequate illumination (generally about 1100 lumens/meter^2 [100-foot candles] or more).



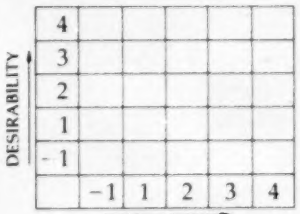
Comments _____

5. Master cutoffs for all utilities are conveniently located, marked, plainly and readily accessible.



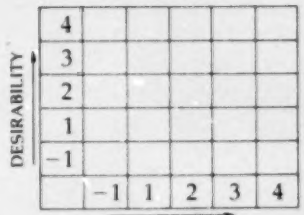
Comments _____

6. Our laboratories are provided with adequate ventilation, fume hoods, and heat removal systems.



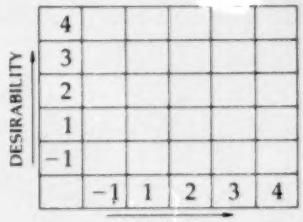
Comments _____

7. Safety-glass screens or shields are available at each demonstration table.



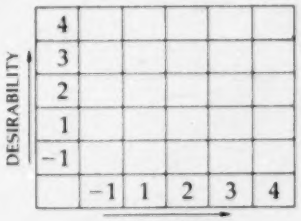
Comments _____

8. Laboratories are equipped with a readily accessible fire blanket and fire extinguishers.



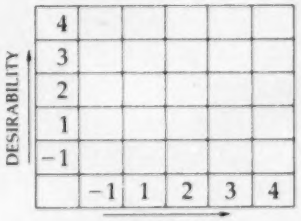
Comments _____

9. Laboratories are equipped with a readily accessible shower and an eye-wash fountain.



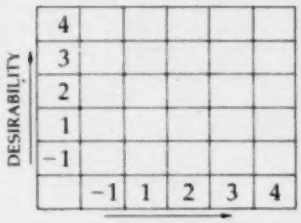
Comments _____

10. Each laboratory has a readily accessible, properly equipped first-aid cabinet.



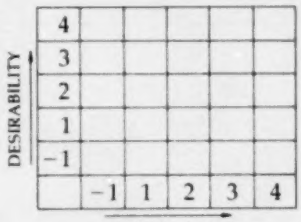
Comments _____

11. Safety goggles are mandatory for students, teachers and classroom visitors.



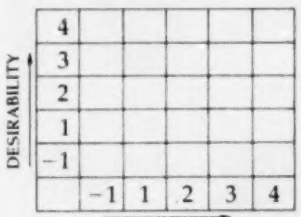
Comments _____

12. Laboratory coats or aprons are required and provided for students and teachers.



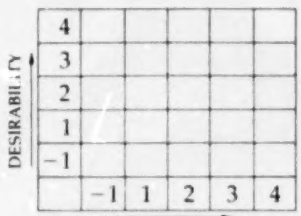
Comments _____

13. All possibly hazardous materials (i.e., chemical reagent bottles) are labeled with safety precautions and used only under direct supervision.



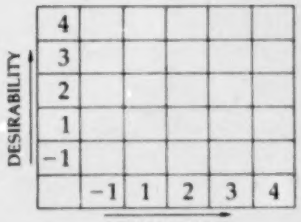
Comments _____

14. Printed, easily accessible instructions for handling laboratory accidents are available and known by the teacher.



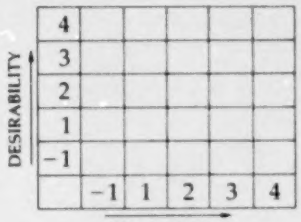
Comments _____

15. All utilities are located on the tops of the laboratory tables.



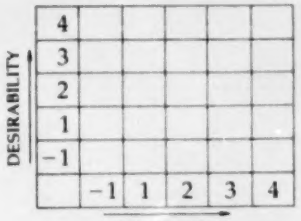
Comments _____

16. Printed, easily readable safety precautions are posted in each laboratory.



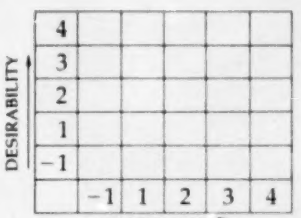
Comments _____

17. Annual safety checks are required and completed for laboratory and stockroom areas.



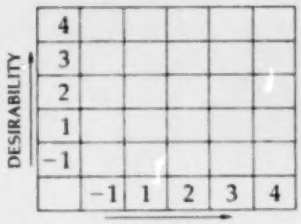
Comments _____

18. The storage and human consumption of food or beverage in the science department is prohibited.



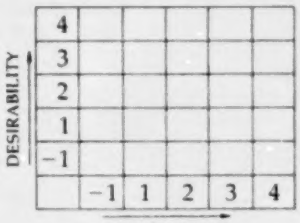
Comments _____

19. Electric outlets near sinks are equipped with ground-fault circuit breakers.



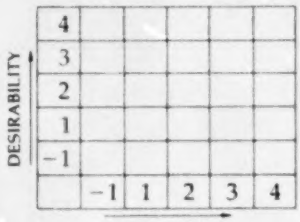
Comments _____

20. Other: _____



Comments _____

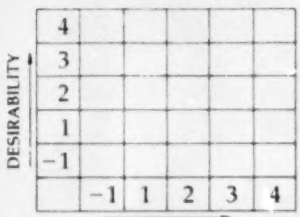
21. Other: _____



Comments _____

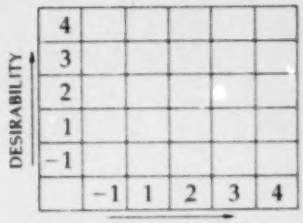
C. Teaching/Learning Equipment and Materials

1. Up-to-date textbooks and laboratory manuals (or equivalent materials in courses designed not to have textbooks or lab manuals) are provided for every student.



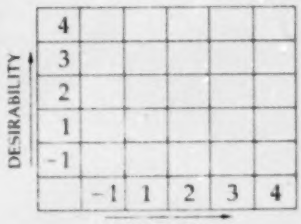
Comments _____

2. Supplementary books, reference books, and other printed materials representing a considerable range of sophistication and diversity of student interest are provided.



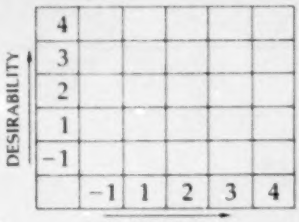
Comments _____

3. Various programmed learning materials are available to facilitate independent student learning of specific skills and content.



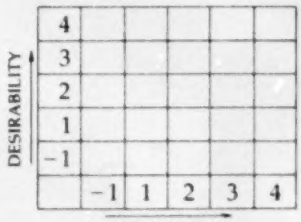
Comments _____

4. Students are provided access to a computer and appropriate software and are instructed in the use of this equipment.



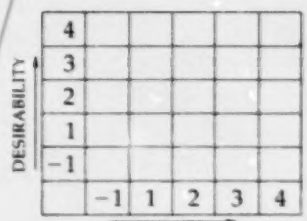
Comments _____

5. The school or department library includes an adequate selection of books, periodicals, and pamphlets on the sciences, the social impact of science, and the history, philosophy, and sociology of science and technology.



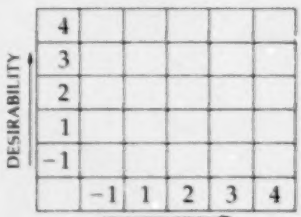
Comments _____

6. Filmloops, transparencies, filmstrips, and motion pictures are available and attainable when needed by students and/or teachers.



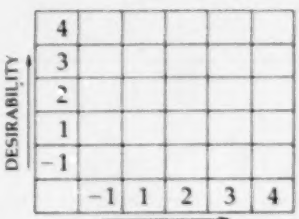
Comments _____

7. Projectors for filmloops, filmstrips, motion pictures, and transparencies are available and attainable when needed.



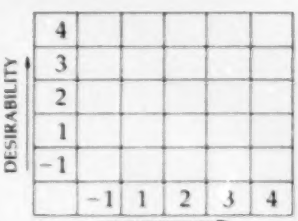
Comments _____

8. The recorders and cassettes are available and attainable when needed.



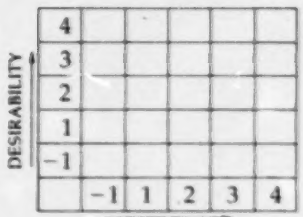
Comments _____

9. Equipment and materials for laboratory experimentation and individual student projects are adequate and available when needed.



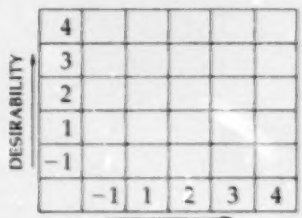
Comments _____

10. The system of distribution of laboratory supplies and equipment is reasonably simple and efficient.



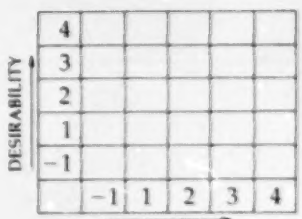
Comments _____

11. Provisions are made for prompt replacement of equipment that wears out or is lost, stolen, or damaged beyond repair.



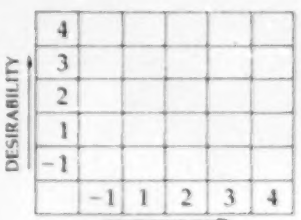
Comments _____

12. An effective, continuous inventory of science equipment and supplies is maintained.



Comments _____

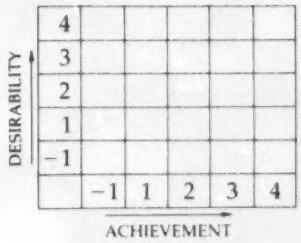
13. Catalogues of science equipment and supplies are readily available to science teachers.



Comments _____

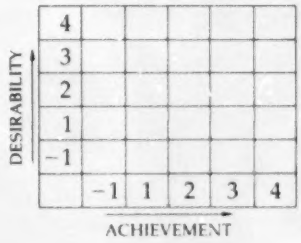
12

14. Procedures for requesting and ordering supplies and equipment are reasonable, simple, and efficient.



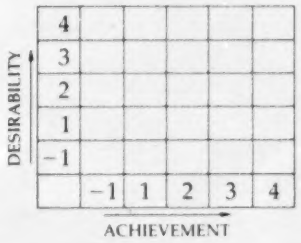
Comments _____

15. Science teachers are centrally and effectively involved in the selection and purchase of all instructional equipment and materials for use in the science department.



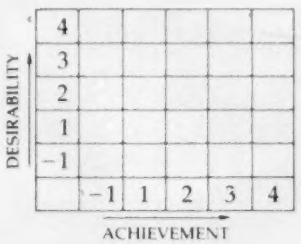
Comments _____

16. Other: _____



Comments _____

17. Other: _____

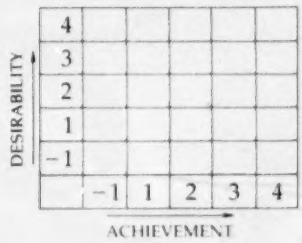


Comments _____

D. Staff Policies and Practices

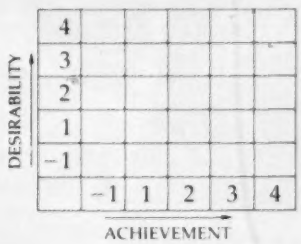
This section deals with utilization, development, and evaluation of staff. The items that follow should be rated for **level of desirability** and on **degree of achievement** or extent of practice, as in previous parts of this module. The assessment team should include representation from parents, the community, the administration, and possibly other groups, as well as the science faculty, but students may be omitted if desired.

1. In making teaching assignments, primary consideration is given to quality of instruction for students, with the secondary consideration given to factors such as seniority and/or years of experience of teachers; solicited and expressed preferences of teachers; other.



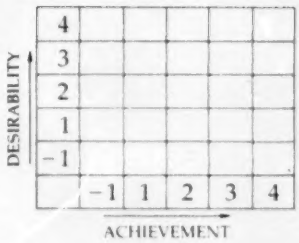
Comments _____

2. In assigning teachers, an attempt is made to limit to two the number of distinctly separate academic preparations; e.g., biology and general science, chemistry and physics, physics and mathematics.



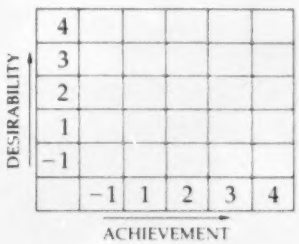
Comments _____

3. In assigning beginning teachers or teachers new to the school, special care is taken to avoid assigning very large or difficult classes, more than two preparations, heavy responsibilities beyond class assignments, or schedules requiring frequent room changes.



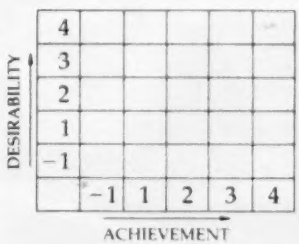
Comments _____

4. Adjustments in teaching loads (the number of classes taught per day or the daily student load) are made to compensate for assigned responsibilities outside the classroom, or more than two preparations, or approved professional activities, and the like.



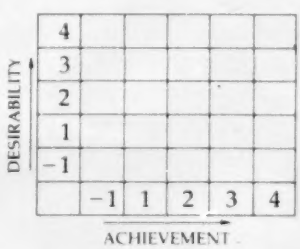
Comments _____

5. Team teaching is practiced when and where there is reason to believe that this will result in better programs for students.



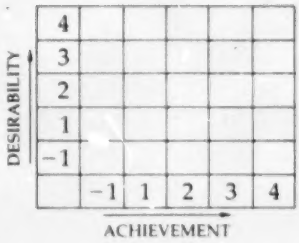
Comments _____

6. Class size in science courses is determined by the type(s) of instruction employed, the ability levels of the students, the numbers of laboratory stations, and safety considerations, as well as economic factors and master schedule considerations.



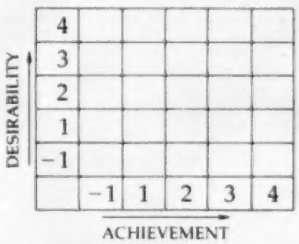
Comments _____

7. Every science teacher's schedule includes adequate time to make preparations for laboratory work and demonstrations as well as to prepare for classroom teaching.



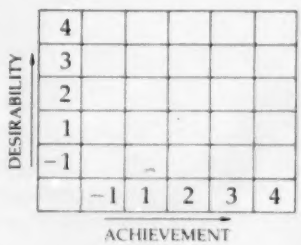
Comments _____

8. The science program development for our school has support from the school administration to seek solutions to science curriculum problems and needs; such support includes: adequate released time for committee members to work; summer curriculum workshops with staff or committee members continued on regular salary; regularly scheduled meetings of science staff and/or committee to discuss problems and needs; adequate budget for supplies, materials, secretarial help, salaries, or honoraria; other.



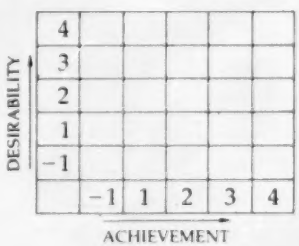
Comments _____

9. Procedures for evaluation of teacher performance are characterized by definite, agreed-upon practices, means, and instruments.



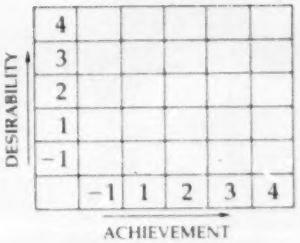
Comments _____

10. Procedures for evaluation of teacher performance are characterized by prior agreement between teacher and evaluator(s) as to goals, objectives, and means of evaluation to be used.



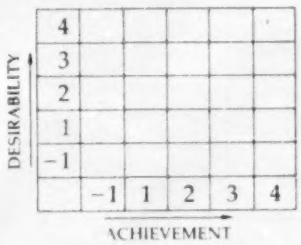
Comments _____

11. Procedures for evaluation of teacher performance are characterized by involvement of other teachers (peers) as well as administrators and/or supervisors or department chairmen as evaluators.



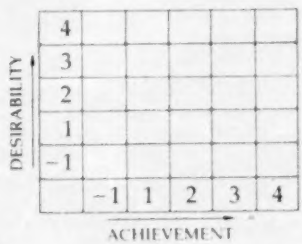
Comments _____

12. Self-evaluation is a part of the total evaluation process; e.g., videotaping and reviewing teacher and student interaction.



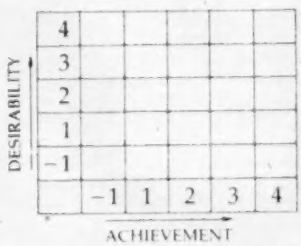
Comments _____

13. Evaluation by students is a part of the total evaluation of teacher performance.



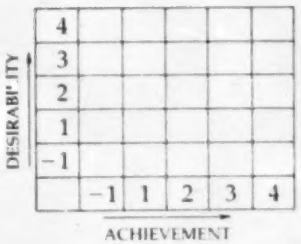
Comments _____

14. Evaluation of teacher performance includes a variety of diagnostic procedures, such as opinion surveys, questionnaires, observations, discussions.



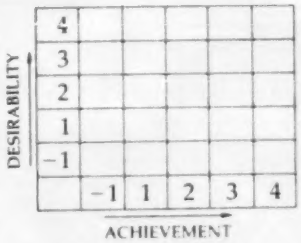
Comments _____

15. Evaluation of teacher performance is followed up through discussion of observations and other data, culminating in recommendations for professional growth activities to improve performance.



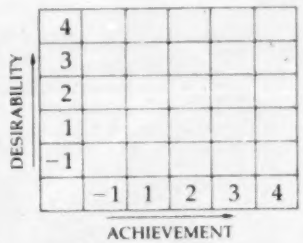
Comments _____

16. The school system encourages and supports teacher participation and professional growth activities in a variety of ways; for example, teachers are involved in determining the content and structure of local in-service programs by encouraging teachers to join and participate in national and state organizations for science teachers.



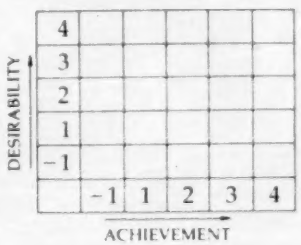
Comments _____

17. Released time and substitutes are provided in support of teachers who participate as officers, as committee members, and in the meetings of science teacher organizations.



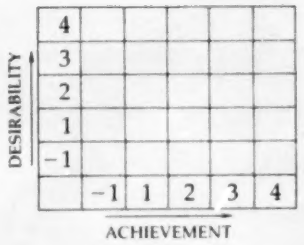
Comments _____

18. The school district reimburses the expenses involved in attending meetings of state or national organizations of science teachers.



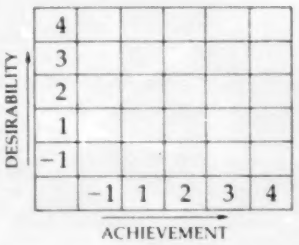
Comments _____

19. Information about professional growth activities for science teachers is disseminated, and teachers are encouraged to apply for and take advantage of these; e.g., NSF institutes, extension courses, sponsored conferences.



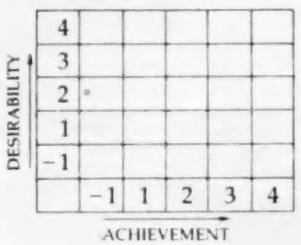
Comments _____

20. Leaves of absence without pay are granted for professional growth activities.



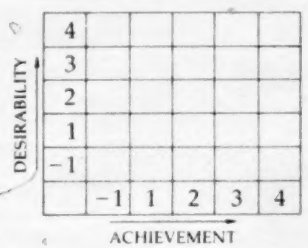
Comments _____

21. Sabbatical leaves with partial or full salary are granted for updating or professional growth activities.



Comments _____

22. Substantial rewards, such as increases in salary, status as a master teacher, and various kinds of professional recognition are provided to teachers for accomplished professional growth activities.

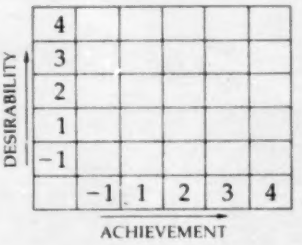


Comments _____

23. The professional time of the staff is used to a maximum.

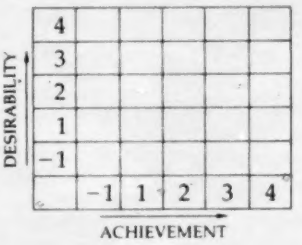
Comments _____

24. Other: _____



Comments _____

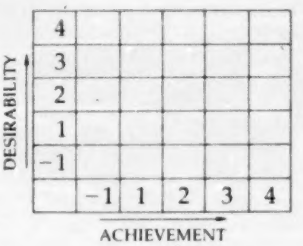
25. Other: _____



Comments _____

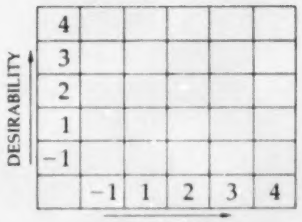
E. Support Services

1. In our total science department, at least one person has been designated chairman with an adjusted teaching load to provide **at least 20 percent** of the school work week for administrative and supervisory duties.



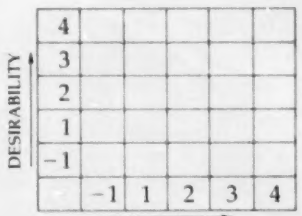
Comments _____

2. The staff of our science department includes one or more laboratory assistants (paraprofessionals).



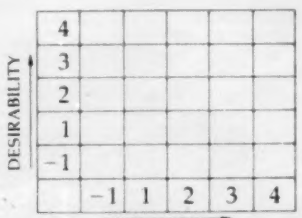
Comments _____

3. Adequate secretarial and clerical help (not students) is available to the teachers in our department.



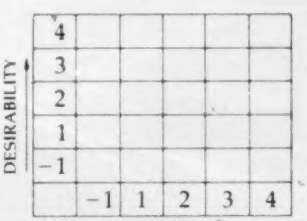
Comments _____

4. Adequate duplicating facilities and services are available to the teachers.



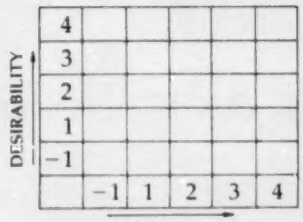
Comments _____

5. Production facilities are available for the preparation of instructional materials such as transparencies, study prints, slides, posters, charts.



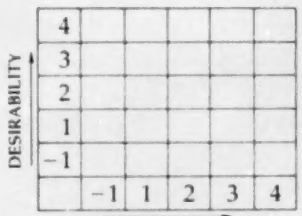
Comments _____

6. Funds and support are provided to call in consultants and specialists needed to help the science teachers and the department.



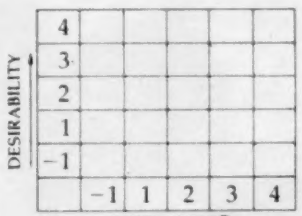
Comments _____

7. The science teachers have a voice in developing the science department budget; e.g., the size, content, and priorities.



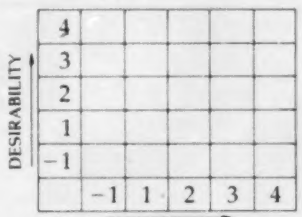
Comments _____

8. Science teachers are involved in selection of library materials (acquisition desirability).



Comments _____

9. The science department budget is identified as a separate line item, or series of line items in the entire budget of the school.



Comments _____

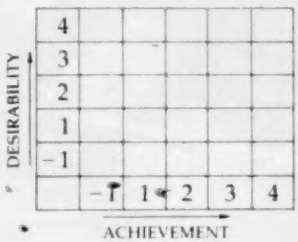
10. The science department budget is comprised of line items for equipment (capital outlay), supplies, maintenance, rental of films, field trips, etc.

Comments _____

11. The allocation of funds for the science department budget recognizes that a threshold amount is needed to support any science course, as well as a per student allocation.

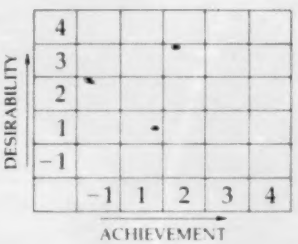
Comments _____

12. Procedures for ordering and procuring include flexibility to permit purchase during the year of living materials, special project materials, and other items, the specific timing and needs for which cannot be predicted far in advance.



Comments _____

13. When items are cut from the science budget, the teachers determine what is to be cut.



Comments _____

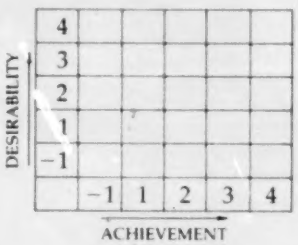
14. The science department has a priority list of capital outlay equipment which should be obtained during the next few years.

Comments _____

15. External sources of funding for special projects, innovations, and research-type activities in science are utilized effectively by our science department; e.g., NDEA, Elementary and Secondary Education Act, National Science Foundation, and other federal and state sources, private foundations, business-industry.

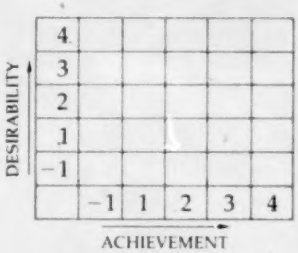
Comments _____

16. The administration supports a teacher's professional decisions; e.g., in classroom discipline, in the assignment of grades or marks.



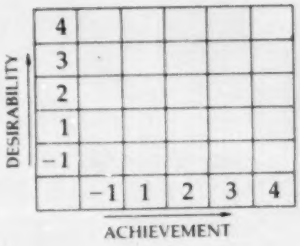
Comments _____

17. Lines of communication that tie students, teachers, and administration together are open and effective.



Comments _____

18. The administration supports thoughtfully conceived curriculum and instructional innovations.



Comments _____

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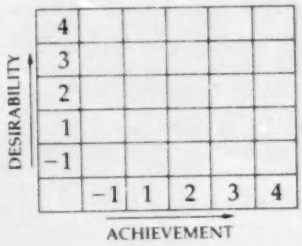
19. The administration seeks and works to provide working conditions that foster excellence in the teaching and learning of science.



Comments _____

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_____

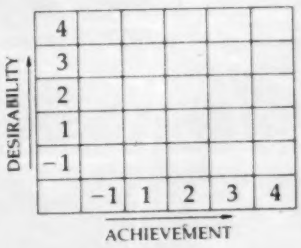
20. Other: _____

_____

_____

_____

Comments _____



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_____

21. Other: _____

_____

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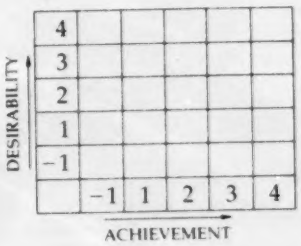
_____

Comments _____



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